Navy Warfare Development Command

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NWDC M&S Objective

To create a condition/state where novel war fighting concepts involving C2 architectures, organizations, and technologies can be end to end and repeatedly stimulated in a robust and scalable manner in the field and laboratory

Directly relates to the direction, management of information flow to critical nodes of war fighting decision makers

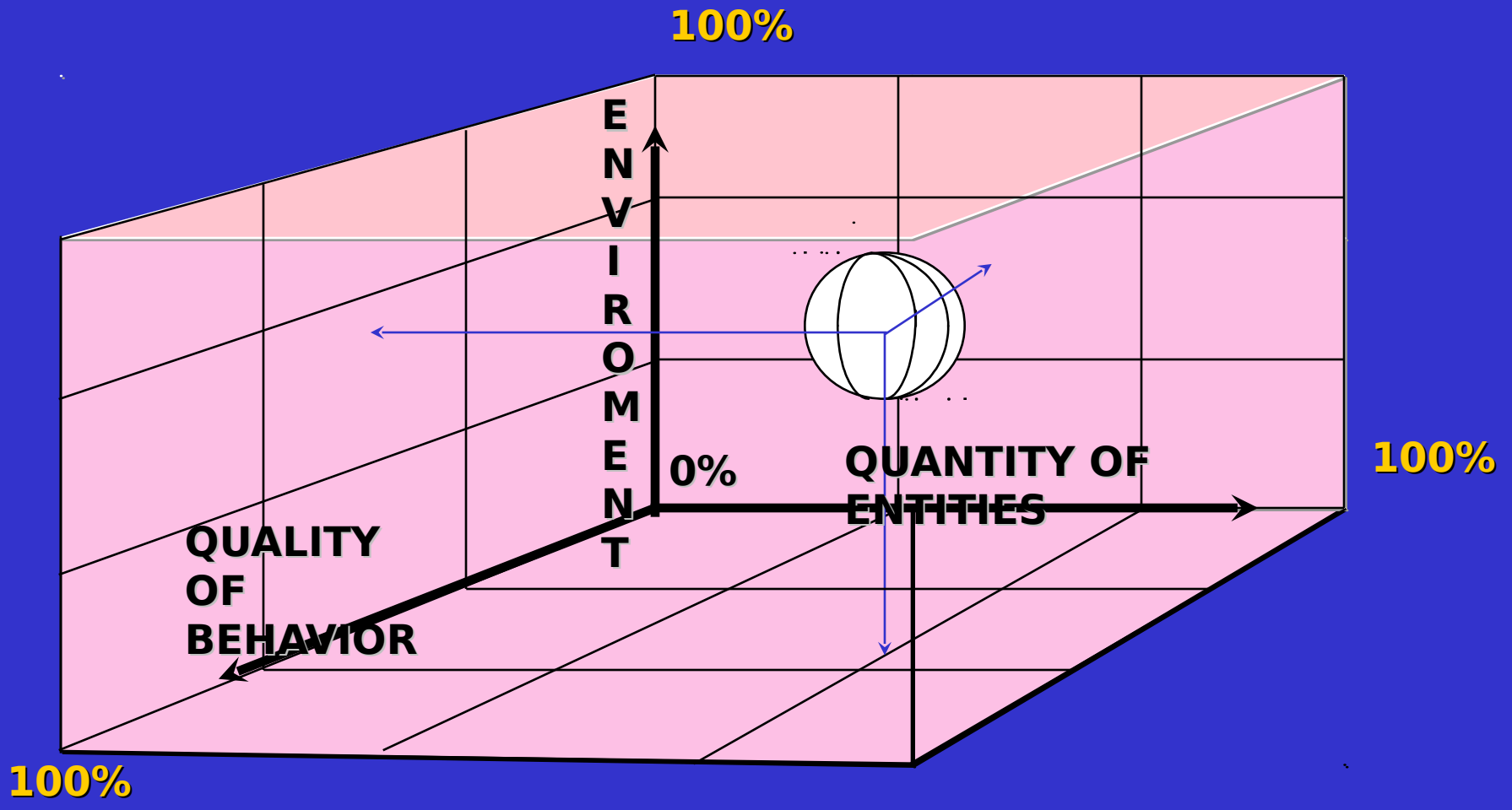
M&S Uses/Need in Experimentation (Training?)

- Stimulate novel C2 (organizations) and C4I (systems) architecture for integration and testing
- Produce operational scenarios to embed experimental concept/initiative
- Provide for experimental repeatability live opportunities fail to offer
- Prevent experimentation from being “pulled back to the present”

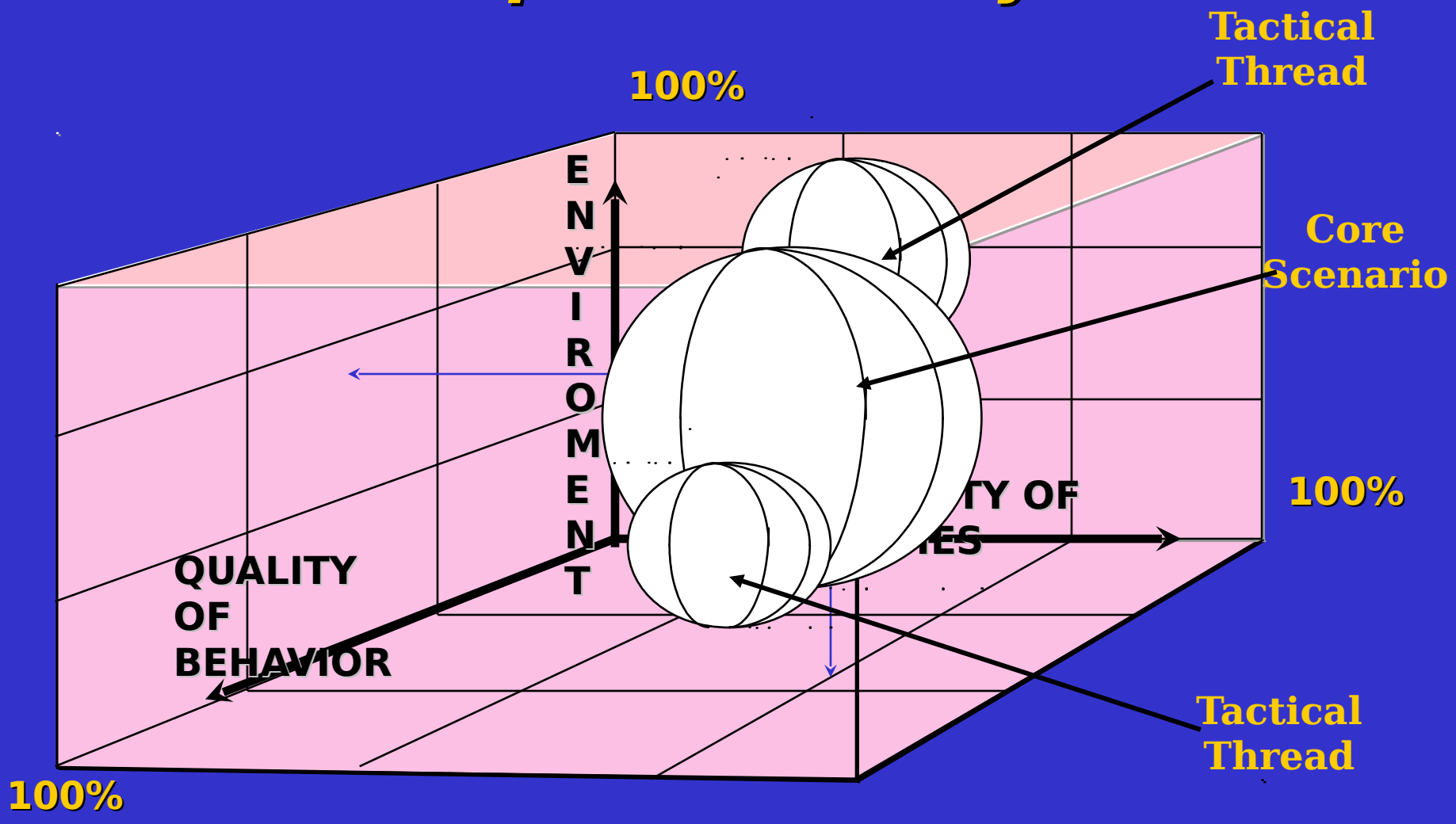
C4I In Simulation

- Not a technically driven problem
- User requirement driven
- Requires a strong core simulation with the requisiteC4I representations
  - Radios/comm paths
  - C2 behavior models
    - Intel
    - Surveillance
    - Tracking Functions (de-confliction/dual reporting)
    - Engagement
    - BDA/Assessment
  - Less Costly
- Has to be developed/delivered in a way that the user/Fleet can use
- Investment focused at development vice execution

Simulation Fidelity

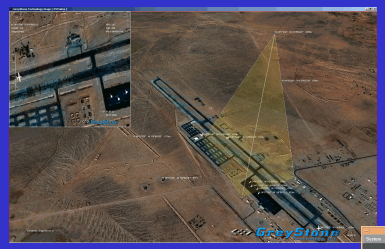


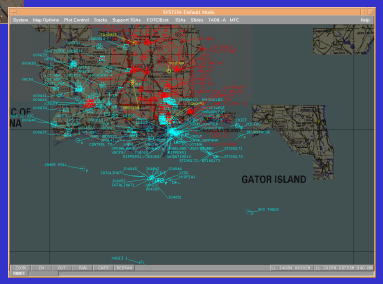
Required Fidelity

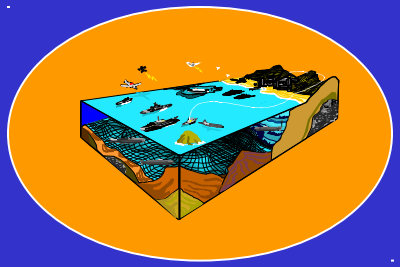


Objective System

Surveillance → Detect → Classify → Identify → Engage → Assess







JSAF
Simulation

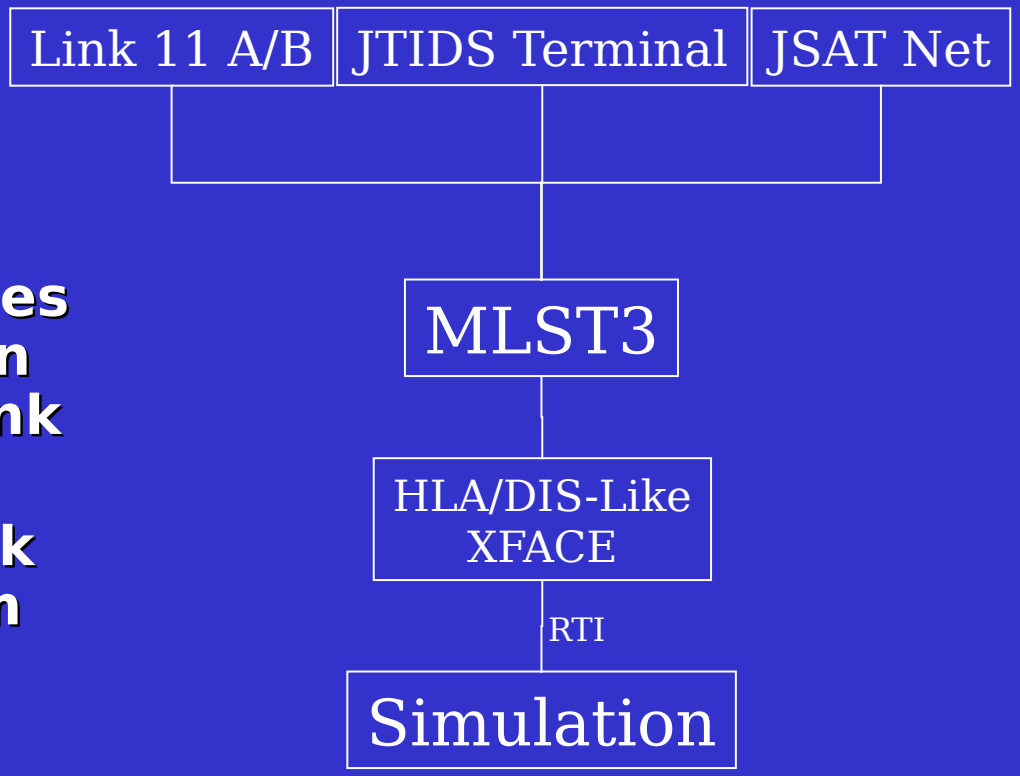
ulate entire end-to-end scenario from a common simulation

Technical Implications

- **Multi-resolution tool chest**
  - **Implies an HLA solution**
- **More resolution requires more data and preparations**
  - **ATO**
  - **MIDB**
  - **Cultural and Natural Data**
  - **Civil Processes (social, political, economic)**
- **Environments**
  - **Terrain, ocean**
  - **In-situ to serve Live, Virtual, Constructive mix**

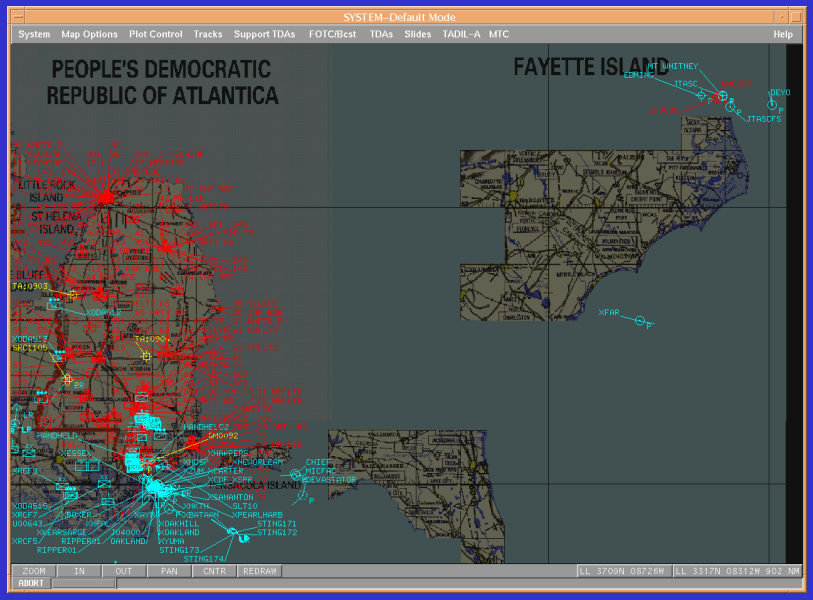
Tactical Data Link

- MLST3 Based
- A,B, Capable
- 1553 and Serial J Capable
- Allows for 126 entities within the simulation to have dedicated link generation
- Capable of 2-way link send receive live sim
- Re-engineering planned for FY-02



C4I Gateway

- C4I Universal Interface to:
  - GCCS/M/A
  - ASAS
  - GALE
  - AFATDS (in work)
- TACELINT
- Intelligence
- Output based on collection and reporting models



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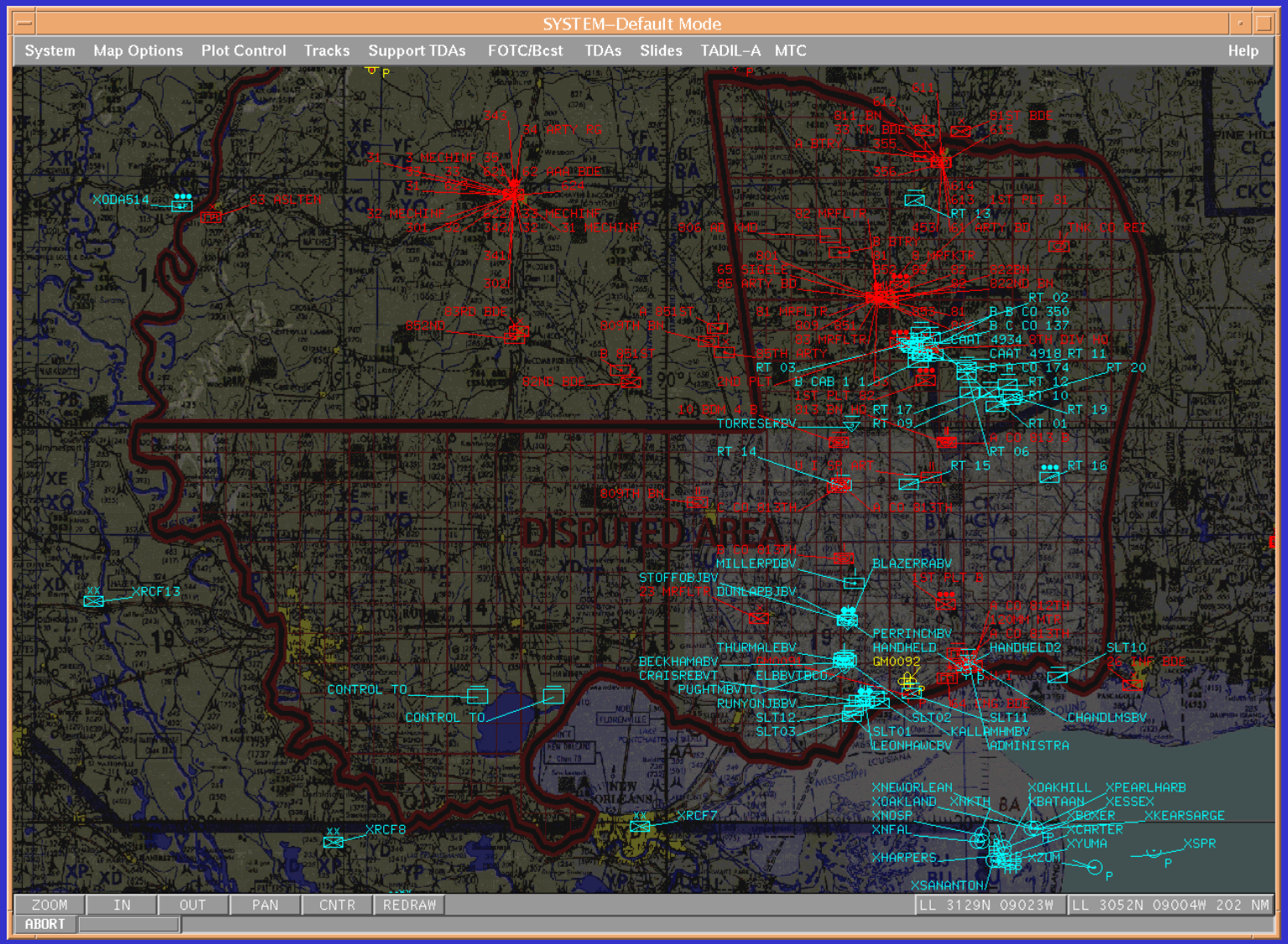

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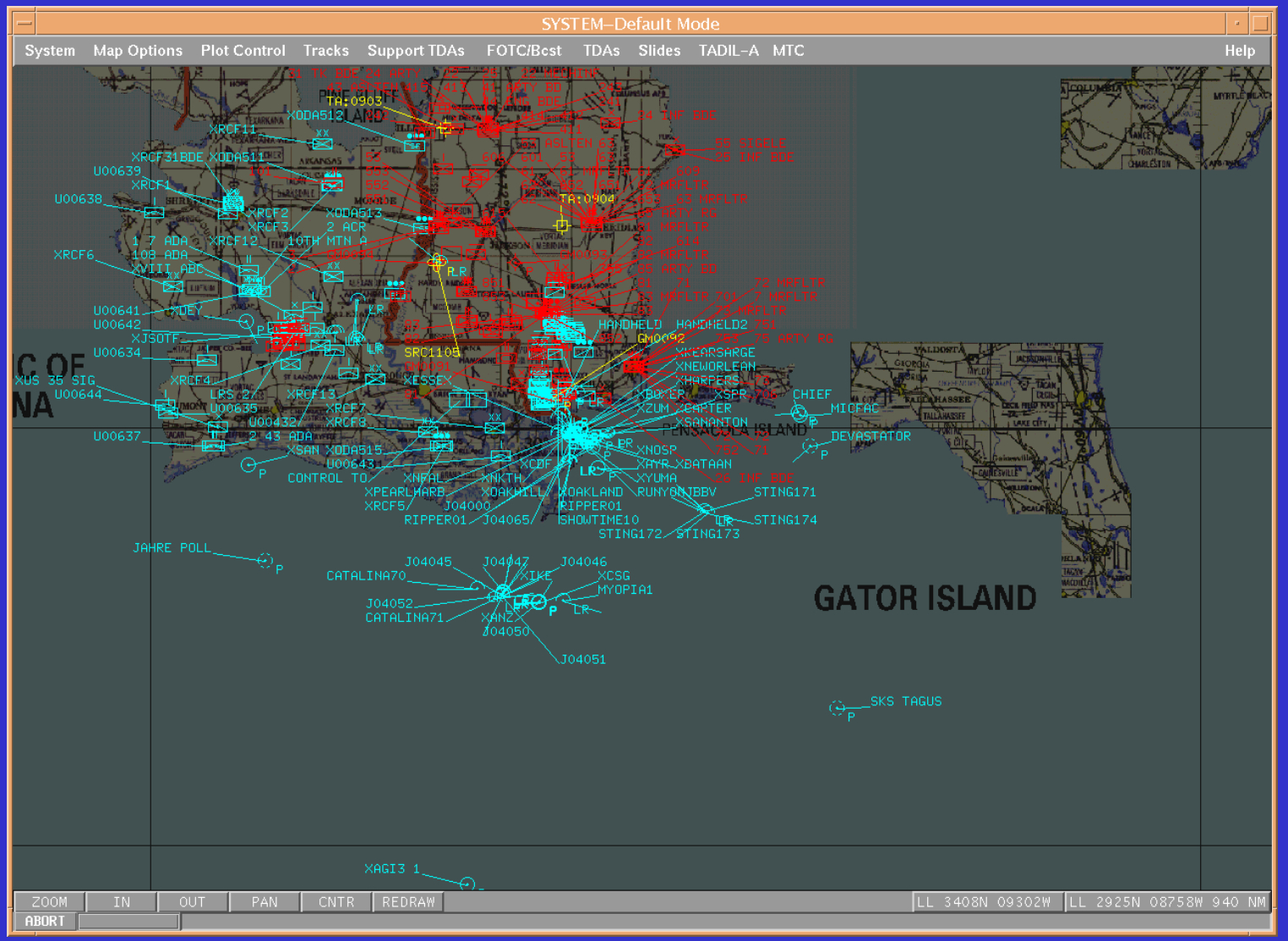


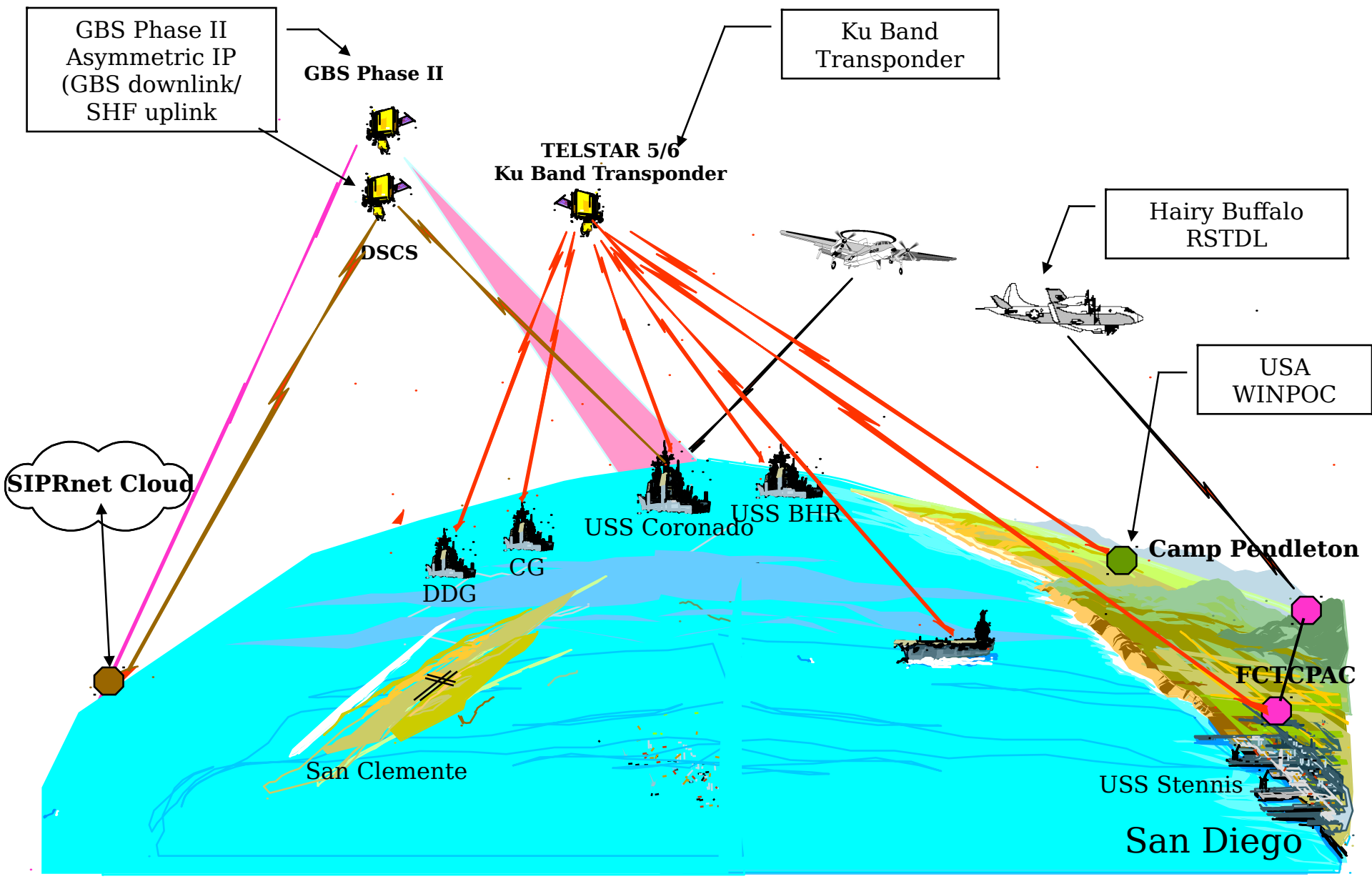
TBMCS Interface

- Reads/Parses the ATO from TBMCS
- Reads threats as published in MIDB
- Uses Intelligent route planner to plan logical route from launch to target/mission area
- Reports to AODB on mission status

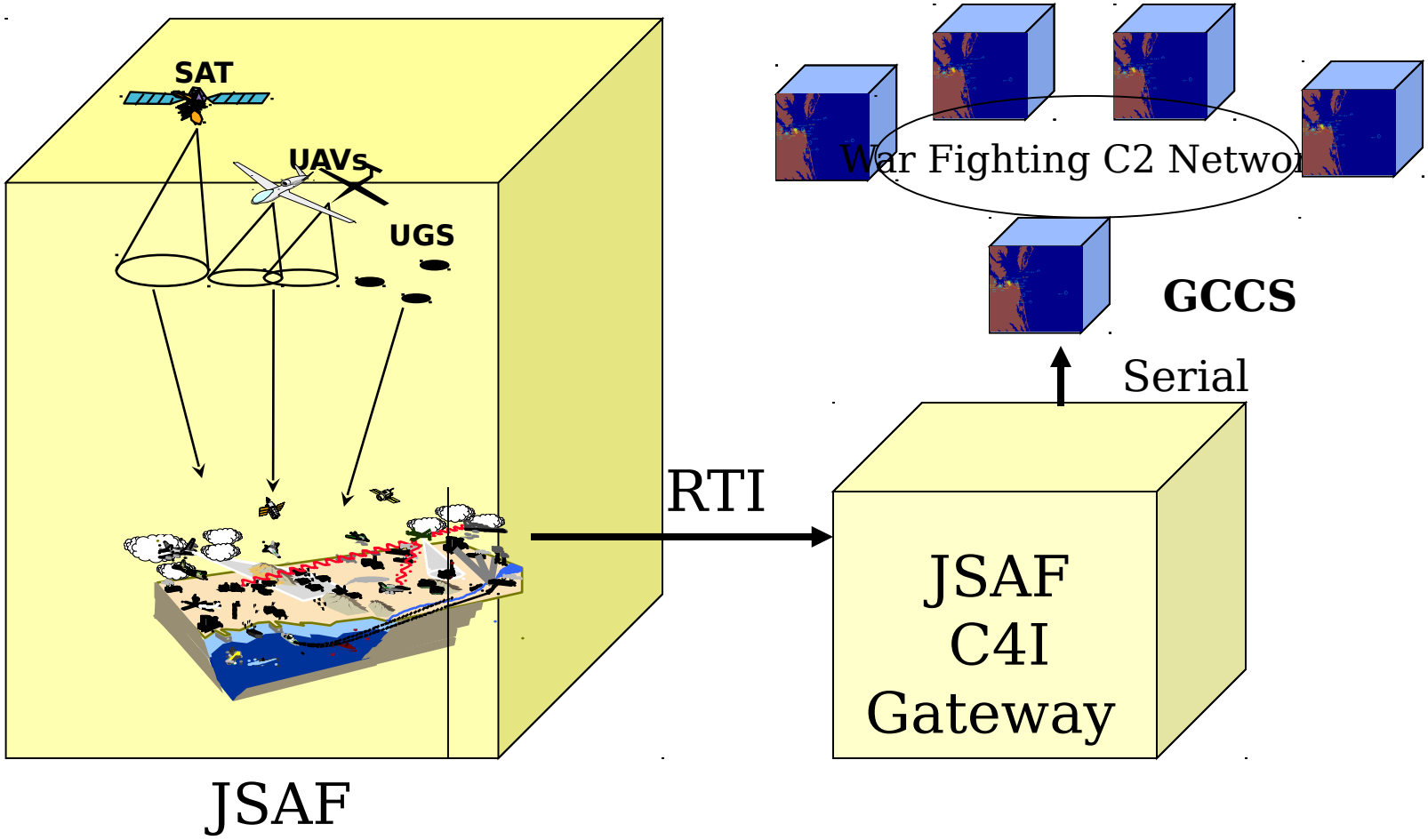
BFTT to Sea

- Carry simulation protocol via Ku Band FBE Architecture
- Use Distributed Data Management Capability inherent in JSAF RTI to manage B/W loadign according to ship sensor capability

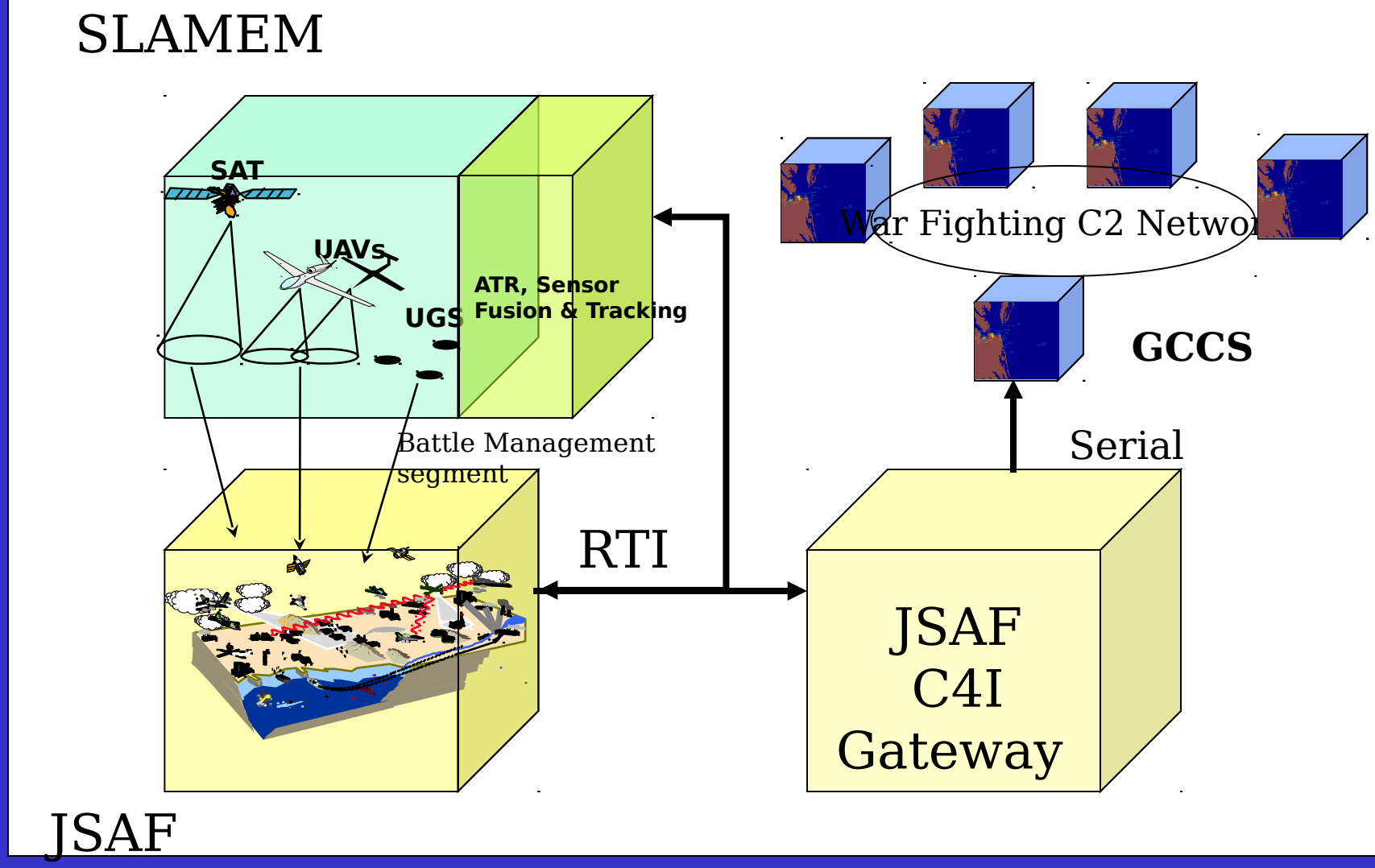
FBE I WAN Connectivity



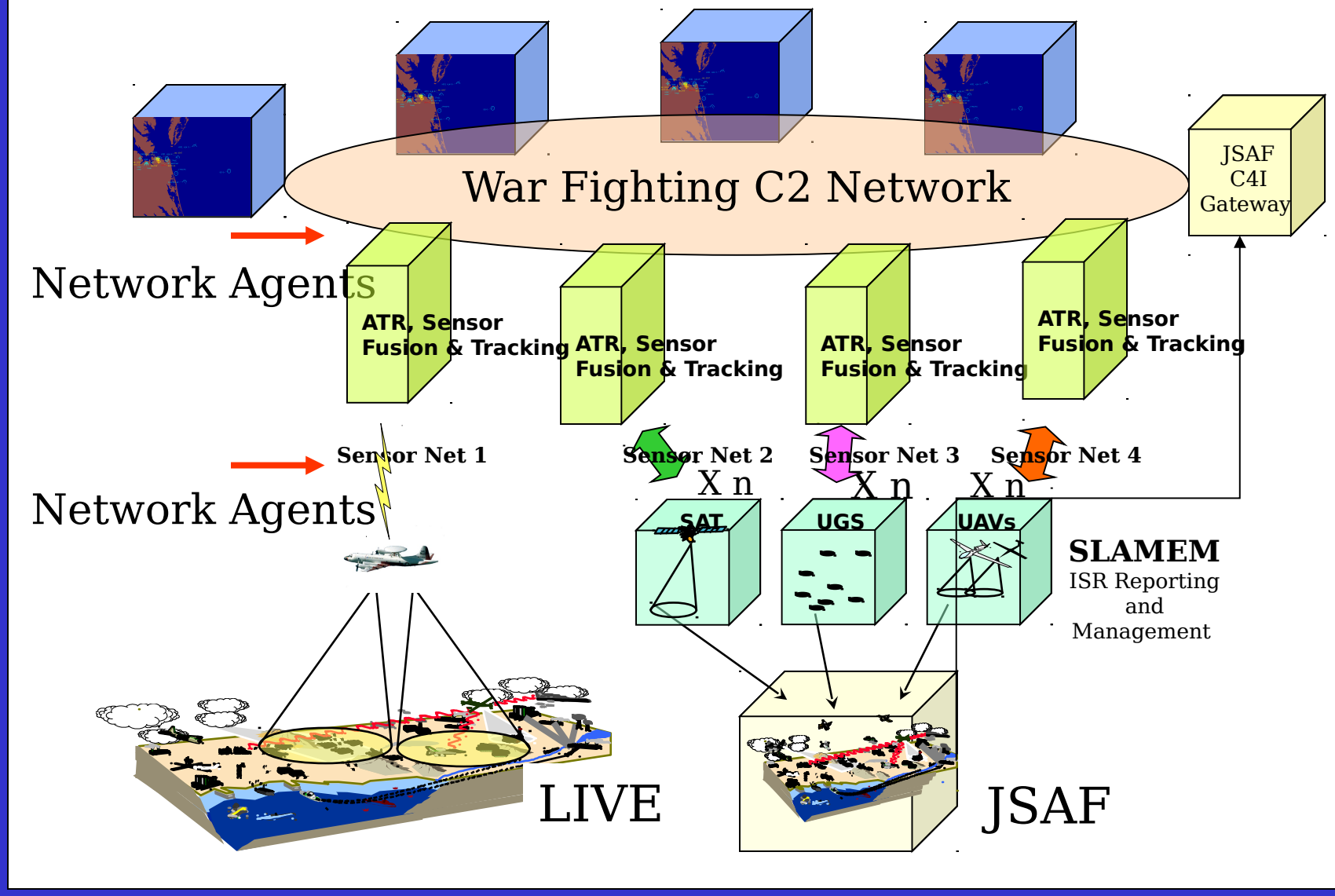
Legacy JSAF Sensor Simulation



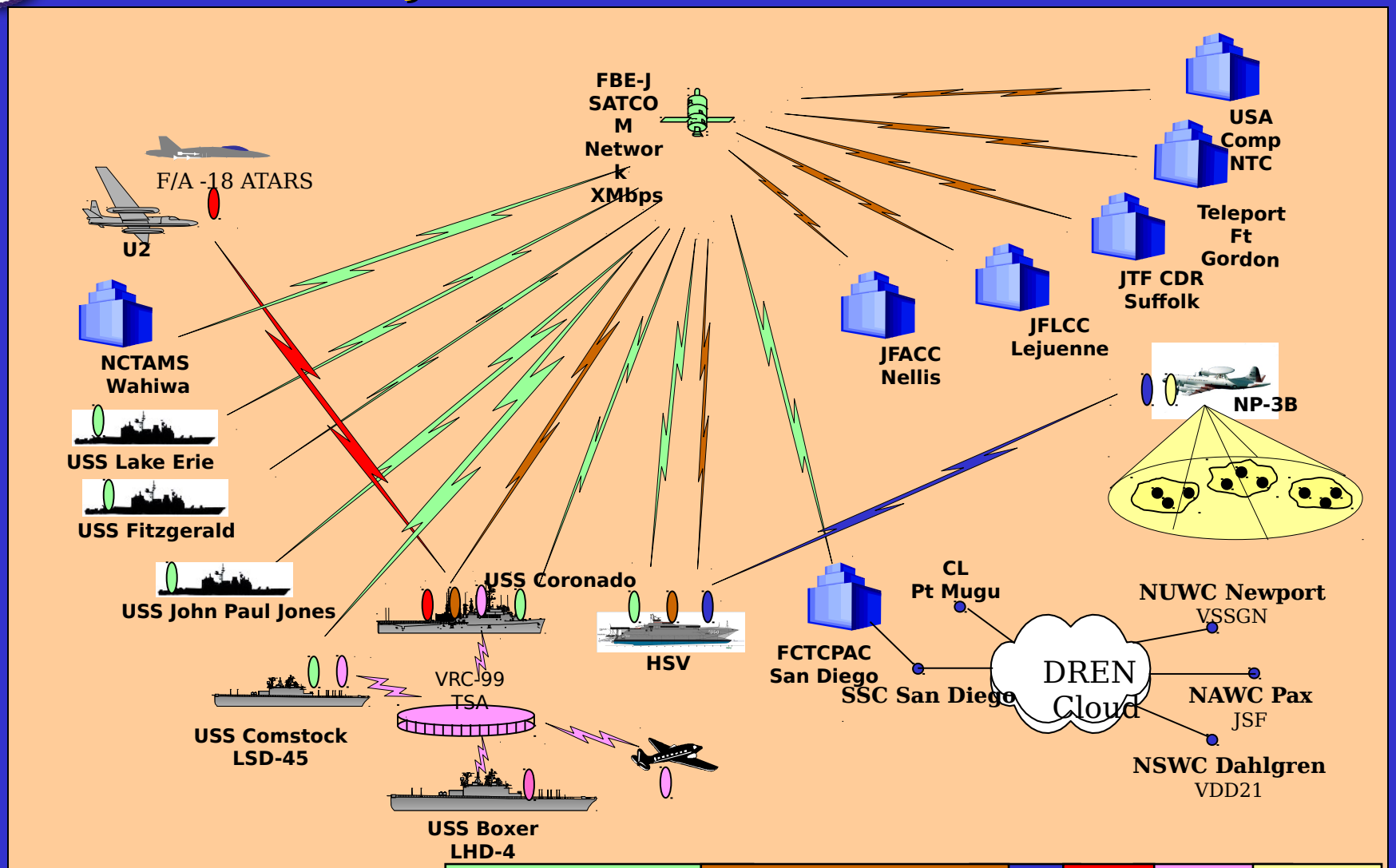
ESG Simulation for Global



ESG Simulation for FBE J ?



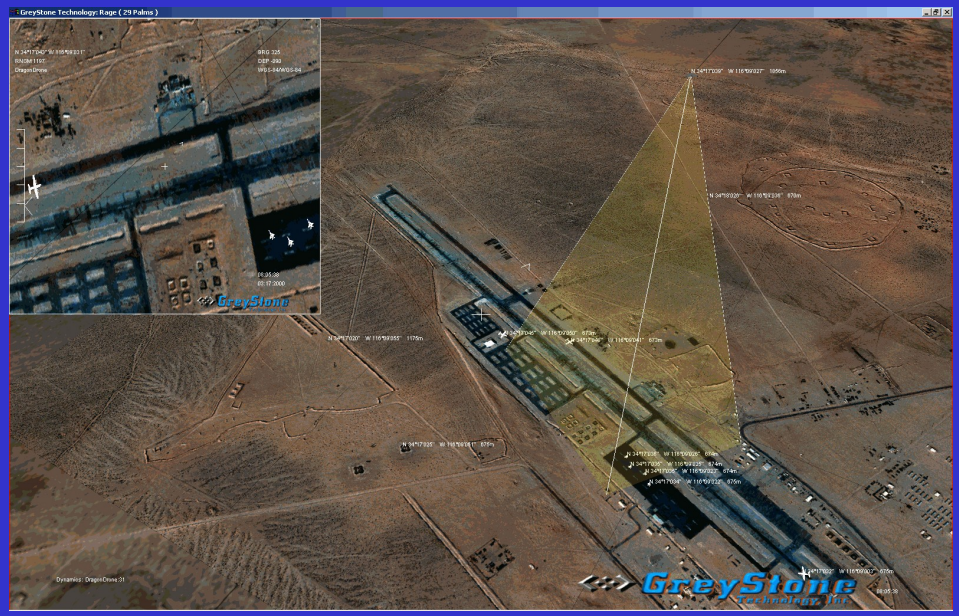
DRAFT FBE J Communications Architecture



DRAFT

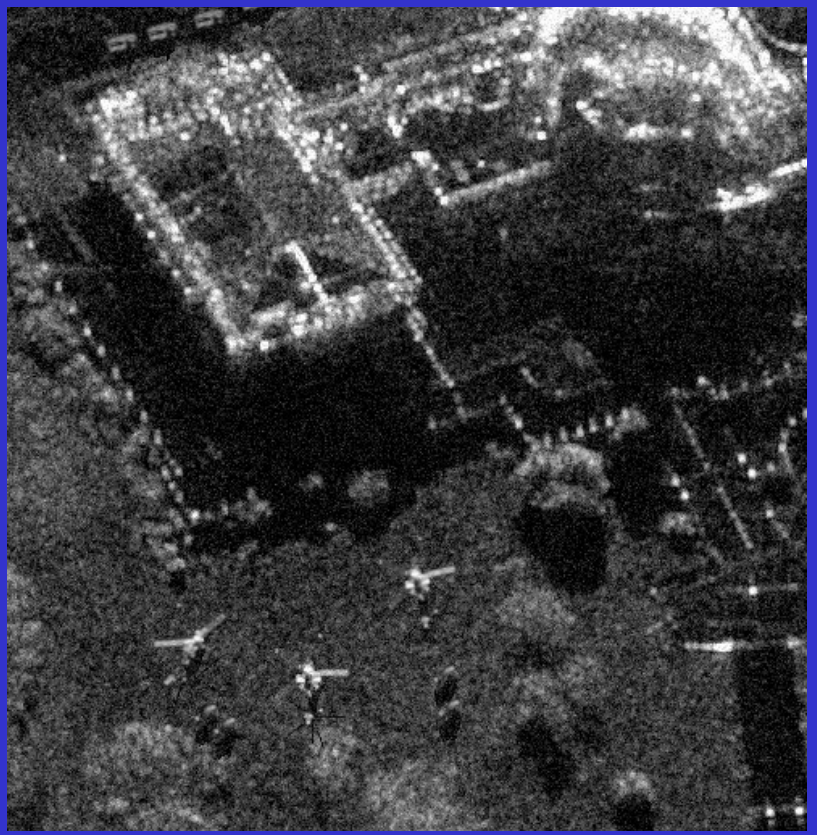
UAVSIM

- Based on MUSE Simulation
- Federated with JSAF
- Uses 1M resolution CIB imagery data
- Fully mensurable
- Custom Imagery Distribution System
- Full Predator Format avaiable



AutoSIGS

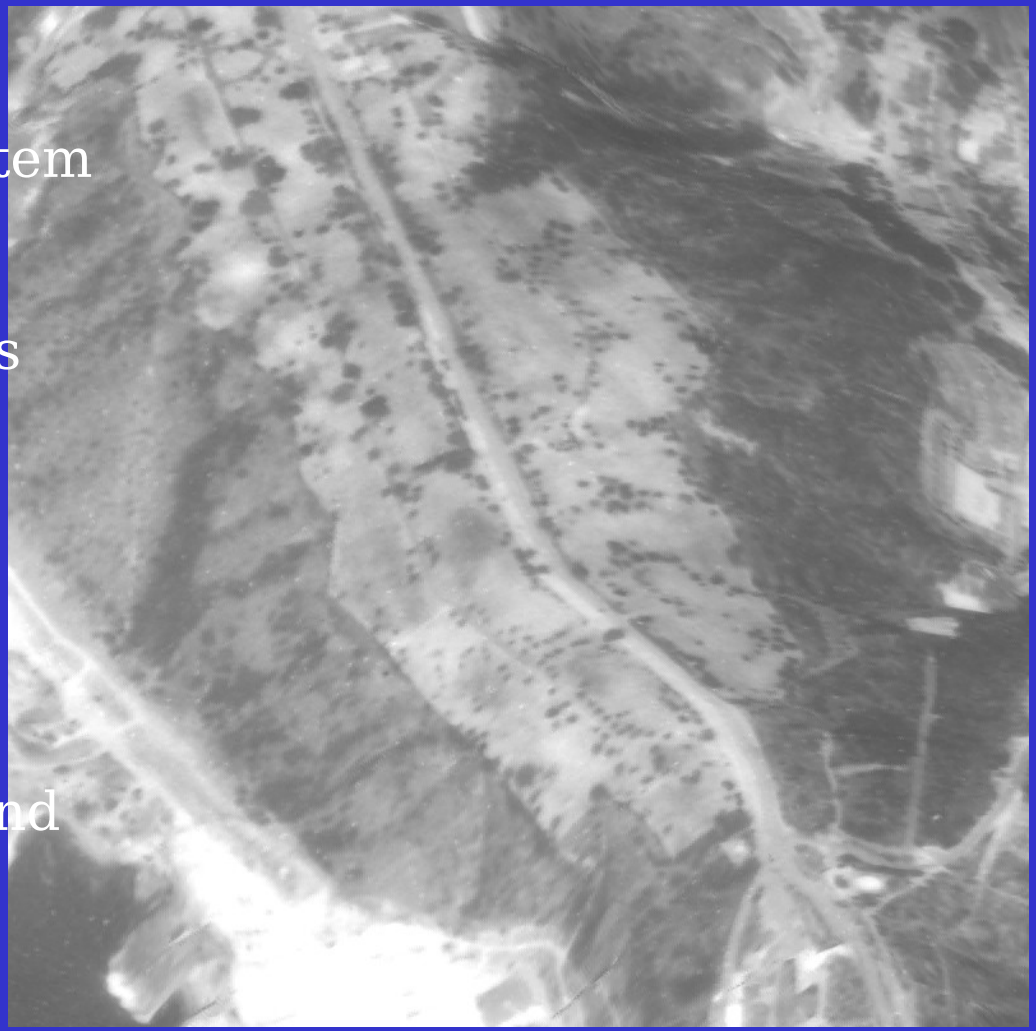
- Federated with JSAF
- Uses NITF 2.0 Files and headers
- Produces raw or clipped imagery
- EO, IR, SAR modes of operations
- NRO is adopting



AutoSIGS Background Image

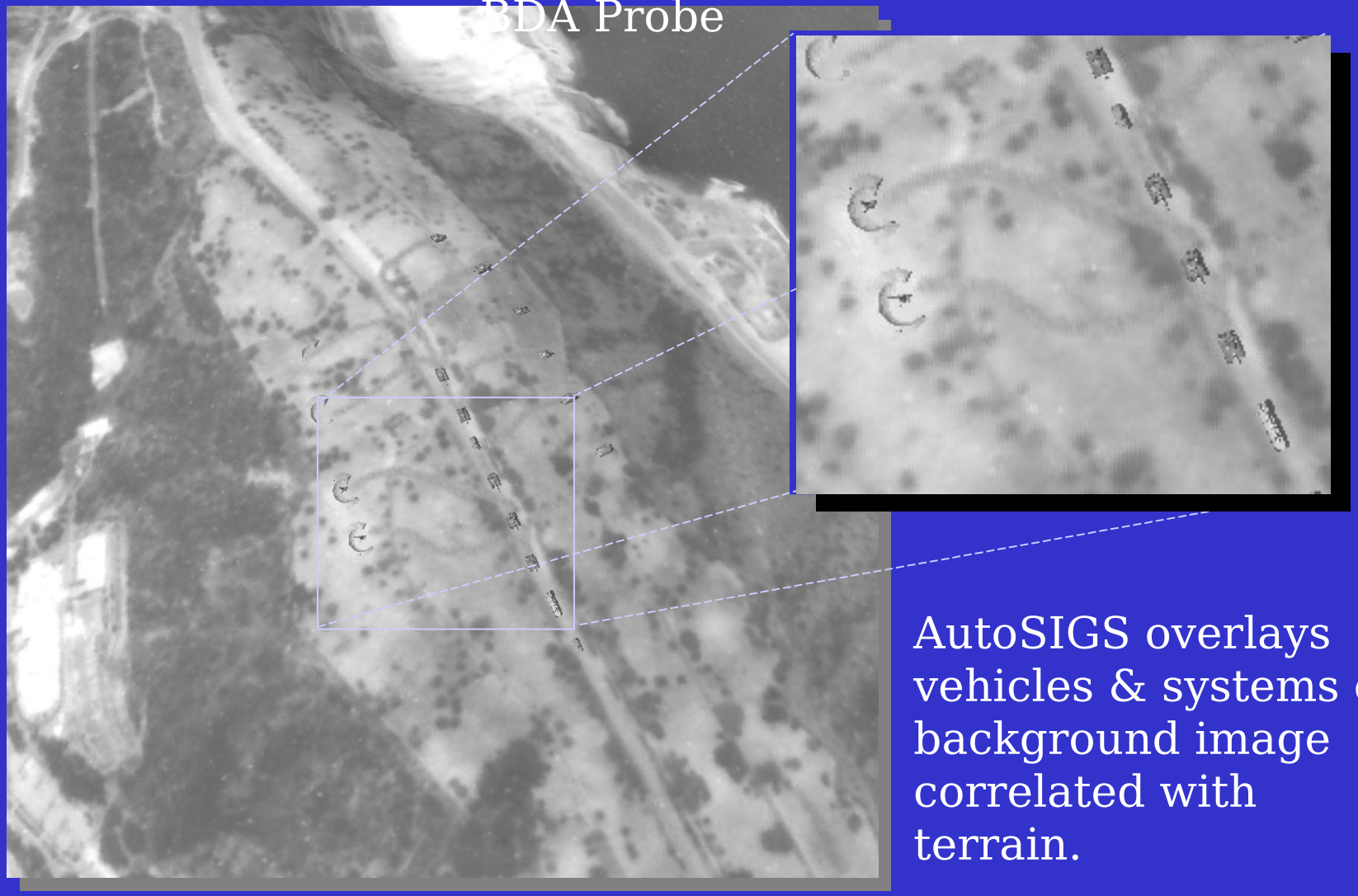
Example JSAF C4ISR system

- BDA probe instruments target area and generates vehicle and system state data including location and damage
- UAVSim application generates correlated overhead imagery on top of blank background



AutoSIGS Pre-Strike Imagery

Vehicle & system locations and damage reported by BDA Probe



AutoSIGS overlays vehicles & systems on background image correlated with terrain.

Others

- NWARS (JSIMS Intelligence Federate)
  - Federated with JSAF
  - Provides National and tactical SIGINT/ELINT
  - Will provide COMINT in near future
- GALE and GALE Lite
  - As stand alone or as GCCS Segment
- Direct stimulation or through NMMC